

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

1. (Currently Amended) An image pick-up apparatus comprising a wavelength converter for converting an incident radiation to a light having a wavelength detectable ~~[[with]]~~ by a photoelectric conversion element on a sensor substrate on which plural photoelectric conversion elements and plural switching elements are deposited, wherein ~~a flattening layer having a flat face on which the wavelength~~ converter is deposited on a flattening layer, and wherein the plural photoelectric conversion elements, the plural switching elements, and the flattening layer is ~~provided~~ are situated between the sensor substrate and wavelength converter.

2. (Original) An image pick-up apparatus according to Claim 1, wherein the flattening layer is obtained by flattening a protective layer provided on the sensor substrate.

3. (Original) An image pick-up apparatus according to Claim 1, wherein the flattening layer is provided on a protective layer on the sensor substrate.

4. (Original) An image pick-up apparatus according to Claim 1, wherein a second flattening layer is provided on the wavelength converter.

5. (Original) An image pick-up apparatus according to Claim 4, wherein the second flattening layer covers the end face of the wavelength converter.

6. (Original) An image pick-up apparatus according to Claim 1, wherein the surface of the wavelength converter is flattened.

7. (Original) An image pick-up apparatus according to Claim 4, wherein a light reflection film is provided on the second flattening layer.

8. (Original) An image pick-up apparatus according to Claim 6, wherein a light reflection film is provided on the flattened wavelength converter.

9. (Original) An image pick-up apparatus according to Claim 1, wherein the wavelength converter comprises a scintillator.

10. (Original) An image pick-up apparatus according to Claim 9, wherein the scintillator comprises a columnar crystal.

11. (Original) An image pick-up apparatus according to Claim 9, wherein the scintillator comprises a CsI crystal.

12. (Original) An image pick-up apparatus according to Claim 7, wherein the light reflection film is made of an aluminum film.

13. (Original) An image pick-up apparatus according to Claim 8, wherein the light reflection film is made of an aluminum film.

14. (Original) An image pick-up apparatus according to Claim 8, having plural sensor substrates.

15. (Currently Amended) An image pick-up apparatus comprising plural sensor substrates on which plural pairs of a photoelectric conversion element and a switching element are deposited,

wherein the plural sensor substrates comprise flattening layers on which a wavelength converter is deposited, and

wherein the photoelectric conversion element, the switching element, and the flattening layer are situated between the sensor substrate and the wavelength converter.

16. (Original) An image pick-up apparatus according to Claim 15, wherein a second flattening layer is provided on the wavelength converter.

17. (Original) An image pick-up apparatus according to Claim 16, wherein the second flattening layer covers the end face of the wavelength converter.

18. (Original) An image pick-up apparatus according to Claim 16, wherein a light reflection film is provided on the second flattening layer.

19. (Original) An image pick-up apparatus according to Claim 15, wherein the wavelength converter comprises a scintillator.

20. (Original) An image pick-up apparatus according to Claim 19, wherein the scintillator layer comprises a columnar crystal.

21. (Original) An image pick-up apparatus according to Claim 20, wherein the scintillator layer comprises a CsI crystal.

22. (Original) An image pick-up apparatus according to Claim 18, wherein the light reflection film is made of an aluminum film.

23. (Currently Amended) An image pick-up system comprising an image pick-up apparatus provided with a wavelength converter for converting an incident radiation to a light having a wavelength detectable ~~[[with]]~~ by a photoelectric conversion element on a sensor substrate on which plural photoelectric conversion elements and plural switching elements are deposited,

wherein ~~a flattening layer having a flat face on which the wavelength converter is deposited~~ on a flattening layer, and

wherein the plural photoelectric conversion elements, the plural switching elements, and the flattening layer is provided are situated between the sensor substrate and wavelength converter, said system comprising:

a signal processing means for processing the signal from the image pick-up apparatus; and

a display means for displaying the signal from the signal processing means.

24. (Original) An image pick-up system according to Claim 23, further, comprising a telecommunication means for transferring the signal from the signal processing means.

25. (Original) An image pick-up apparatus system to Claim 23, further comprising a recording means for recording the signal from the signal processing means.

26. (Original) An image pick-up system according to Claim 23, further comprising a storage means for storing the signal from the signal processing means.

27. (Currently Amended) An image pick-up system comprising:
an image pick-up apparatus comprising plural sensor substrates on which plural photoelectric conversion elements and plural switching elements are deposited, a flattening layer being deposited on the plural sensor substrates and a wavelength converter being deposited on the flattening layer, with the photoelectric conversion elements, the switching elements, and flattening layer being situated between the sensor substrates and the wavelength converter, said system comprising:

a signal processing means for processing the signal from the image pick-up apparatus; and

a display means for displaying the signal from the signal processing means.

28. (Original) An image pick-up system according to Claim 27, further comprising a recording means for recording the signal from the signal processing means.

29. (Original) An image pick-up system according to Claim 27, further comprising a telecommunication means for transferring the signal from the signal processing means.

30. (Original) An image pick-up system according to Claim 27, further comprising a storage means for storing the signal from the signal processing means.

31. (Currently Amended) A method for manufacturing an image pick-up apparatus comprising the steps of:

forming a protective layer on a sensor substrate on which plural photoelectric conversion elements and plural switching elements are deposited;

forming a flattening layer having a flat surface on the protective layer; and

depositing a wavelength converter on the flattening layer,
wherein the photoelectric conversion elements, the switching elements, and the flattening layer are situated between the sensor substrate and the wavelength converter.

32. (Currently Amended) A method for manufacturing the image pick-up apparatus according to Claim 31, further comprising a step for providing a second flattening layer on the wavelength converter.

33. (Original) A method for manufacturing the image pick-up apparatus according to Claim 32, wherein the second flattening layer covers the end face of the wavelength converter.

34. (Currently Amended) A method for manufacturing the image pick-up apparatus according to Claim 31, further comprising a step of flattening the wavelength converter.

35. (Currently Amended) A method for manufacturing the image pick-up apparatus according to Claim 32, further comprising a step for providing a light reflection film on the second flattening layer.

36. (Currently Amended) A method for manufacturing the image pick-up apparatus according to Claim 34, further comprising a step of providing a light reflection film on the flattened wavelength converter.

37. (Original) A method for manufacturing the image pick-up apparatus according to Claim 31, wherein the step for forming the wavelength converter comprises a vacuum deposition step.

38. (Currently Amended) A method for manufacturing the image pick-up apparatus comprising the steps of:

forming a protective layer on a sensor substrate on which plural photoelectric conversion elements and plural switching elements are deposited;

flattening the surface of the protective layer; and
depositing a scintillator layer on the flattened protective layer,
wherein the photoelectric conversion elements, the switching
elements, and a flattening layer are situated between the sensor substrate and the
scintillator layer.

39. (Currently Amended) A method for manufacturing the image
pick-up apparatus according to Claim 38, further comprising the [[steps]] step of forming a
second flattening layer on the wavelength converter.

40. (Original) A method for manufacturing the image pick-up apparatus
according to Claim 39, wherein the second flattening layer covers the end face of the
wavelength converter.

41. (Currently Amended) A method for manufacturing the image
pick-up apparatus according to Claim 38, further comprising the step of flattening the
wavelength converter.

42. (Currently Amended) A method for manufacturing the image
pick-up apparatus according to Claim 39, further comprising the step of forming a
reflection film on the second flattening layer.

43. (Currently Amended) A method for manufacturing the image pick-up apparatus according to Claim 41, further comprising the step of forming a light reflection film on the flattened wavelength converter.

44. (Original) A method for manufacturing the image pick-up apparatus according to Claim 38, wherein the step for forming the wavelength converter comprises a vapor deposition step.

45. (Currently Amended) A method for manufacturing an image pick-up apparatus comprising the steps of:

providing plural sensor substrates on which plural pairs of a photoelectric conversion element and a switching element are deposited, a flattening layer being formed on the plural sensor substrates; and

depositing a wavelength converter on the flattened layer,

wherein the photoelectric conversion elements, the switching elements, and a flattening layer are situated between the sensor substrate and the wavelength converter.

46. (Currently Amended) A method for manufacturing an image pick-up apparatus according to Claim 45, further comprising the step of forming a second flattening layer on the wavelength converter.

47. (Original) A method for manufacturing an image pick-up apparatus according to Claim 46, wherein the second flattening layer is provided so as to cover the end face of the scintillator layer.

48. (Currently Amended) A method for manufacturing an image pick-up apparatus according to Claim 46, further comprising a step of providing a light reflection layer on the second flattening layer.

49. (Original) A method for manufacturing an image pick-up apparatus according to Claim 45, wherein the step for providing the wavelength converter comprises a vacuum deposition step.

50. (Original) A method for manufacturing an image pick-up apparatus according to Claim 45, wherein the wavelength converter comprises a scintillator made of a columnar crystal.

51. (Original) A method for manufacturing an image pick-up apparatus according to Claim 45, wherein the wavelength converter comprises a CsI crystal.

52. (Currently Amended) An image pick-up apparatus comprising a wavelength converter for converting an incident radiation to a light having a wavelength detectable ~~[[with]]~~ by a photoelectric conversion element on a sensor substrate on which plural photoelectric conversion elements and switching elements are deposited,

wherein ~~a flattening layer having a flat face on which~~ the wavelength converter is deposited on a flattening layer,

wherein the plural photoelectric conversion elements, the plural switching elements, and the flattening layer is provided are situated between the sensor substrate and wavelength converter, and

wherein the photoelectric conversion elements comprise non-single crystalline semiconductor material.

53. (Previously Presented) The image pick-up apparatus according to Claim 52, wherein the photoelectric conversion elements comprise an amorphous silicon film.